

TABLE 1—UNREGULATED CONTAMINANT MONITORING REPORTING REQUIREMENTS—Continued

Data element	Definition
13. Analytical Result—Value	The actual numeric value of the analytical results for: field samples; laboratory fortified matrix samples; laboratory fortified sample matrix duplicates; and concentration fortified.
14. Laboratory Identification Code	The code, assigned by EPA, used to identify each laboratory. The code begins with the standard two-character State postal abbreviation; the remaining five numbers are unique to each laboratory in the State.
15. Sample Event Code	A code assigned by the PWS for each sample event. This will associate samples with the PWS monitoring plan to allow EPA to track compliance and completeness. Systems must assign the following codes: SE1 = represents samples collected to meet the UCMR monitoring requirement for the first sampling period (all source types). SE2 = represents samples collected to meet the UCMR monitoring requirement for the second sampling period (all source types). SE3 = represents samples collected to meet the UCMR monitoring requirement for the third sampling period (surface water and ground water under the direct influence of surface water (GWUDI) sources only). SE4 = represents samples collected to meet the UCMR monitoring requirement for the fourth sampling period (surface water and GWUDI sources only).

[72 FR 389, Jan. 4, 2007, as amended at 77 FR 26096, May 2, 2012]

Subpart E—Special Regulations, Including Monitoring Regulations and Prohibition on Lead Use

§ 141.40 Monitoring requirements for unregulated contaminants.

(a) *General applicability.* This section specifies the monitoring and quality control requirements that must be followed if you own or operate a public water system (PWS) that is subject to the Unregulated Contaminant Monitoring Regulation (UCMR), as specified in paragraphs (a)(1) and (2) of this section. In addition, this section specifies the UCMR requirements for State and Tribal participation. For the purposes of this section, PWS “population served,” “State,” “PWS Official,” “PWS Technical Contact,” and “finished water” apply as defined in § 141.35(a). The determination of whether a PWS is required to monitor under this rule is based on the type of system (e.g., community water system, non-transient non-community water system, etc.), and its retail population, as indicated by SDWIS/Fed on December 31, 2010.

(1) *Applicability to transient non-community systems.* If you own or operate a transient non-community water system, and you are notified by your State or EPA, you must permit the

State, EPA or their contractors to collect samples for the contaminants specified on List 3 of Table 1, in paragraph (a)(3) of this section.

(2) *Applicability to community water systems and non-transient non-community water systems—(i) Large systems.* If you own or operate a retail PWS (other than a transient non-community system) that serves more than 10,000 people, you must monitor according to the specifications in this paragraph (a)(2)(i). If you believe that your applicability status is different than EPA has specified in the notification letter that you received, or if you are subject to UCMR requirements and you have not been notified by either EPA or your State, you must report to EPA, as specified in § 141.35(b)(2) or (c)(4).

(A) *Assessment Monitoring.* You must monitor for the unregulated contaminants on List 1 and Total Chromium per Table 1, UCMR Contaminant List, in paragraph (a)(3) of this section. If you serve a population of more than 10,000 people, you are required to perform this monitoring regardless of whether you have been notified by the State or EPA.

(B) *Screening Survey.* You must monitor for the unregulated contaminants on List 2 (Screening Survey) of Table 1, as specified in paragraph (a)(3) of this section, if your system serves 10,001 to 100,000 people and you are notified by

EPA or your State that you are part of the State Monitoring Plan for Screening Survey testing. If your system serves more than 100,000 people, you are required to conduct this Screening Survey testing regardless of whether you have been notified by the State or EPA.

(C) *Pre-Screen Testing.* You must monitor for the unregulated contaminants on List 3 of Table 1, in paragraph (a)(3) of this section, if notified by your State or EPA that you are part of the Pre-Screen Testing.

(ii) *Small systems.* Small PWSs, as defined in this paragraph, will not be selected to monitor for any more than one of the three monitoring lists provided in Table 1, UCMR Contaminant List, in paragraph (a)(3) of this section. EPA will provide sample containers, provide pre-paid air bills for shipping the sampling materials, conduct the laboratory analysis, and report and review monitoring results for all small systems selected to conduct monitoring under paragraphs (a)(2)(ii)(A) through (C) of this section. If you own or operate a PWS that serves 10,000 or fewer people you must monitor as follows:

(A) *Assessment Monitoring.* You must monitor for the unregulated contaminants on List 1 and Total Chromium per Table 1, in paragraph (a)(3) of this section, if you are notified by your State or EPA that you are part of the State Monitoring Plan for Assessment Monitoring.

(B) *Screening Survey.* You must monitor for the unregulated contaminants on List 2 of Table 1, in paragraph (a)(3) of this section, if notified by your State or EPA that you are part of the State Monitoring Plan for the Screening Survey.

(C) *Pre-Screen Testing.* You must allow EPA or its representative to collect samples to support monitoring for the unregulated contaminants on List 3 of Table 1, in paragraph (a)(3) of this section, if you are notified by your State or EPA that you are part of the State Monitoring plan for Pre-Screen Testing. In addition, you must permit the collection of samples as necessary for EPA to perform analysis for total coliforms, *E. coli*, bacteriophage, *Enterococci* and aerobic spores.

(3) *Analytes to be monitored.* Lists 1, 2, and 3 of unregulated contaminants and total chromium monitoring are provided in the following table:

TABLE 1—UCMR CONTAMINANT LIST

1-Contaminant	2-CAS Registry No.	3-Analytical methods ^a	4-Minimum reporting level ^b	5-Sampling location ^c	6-Period during which monitoring to be completed
List 1: Assessment Monitoring Chemical Contaminants					
Volatile Organic Compounds					
1,2,3-trichloropropane	96–18–4	EPA 524.3	0.03 µg/L	EPTDS	1/1/2013–12/31/2015
1,3-butadiene	106–99–0	EPA 524.3	0.1 µg/L ..	EPTDS	1/1/2013–12/31/2015
chloromethane	74–87–3	EPA 524.3	0.2 µg/L ..	EPTDS	1/1/2013–12/31/2015
1,1-dichloroethane	75–34–3	EPA 524.3	0.03 µg/L	EPTDS	1/1/2013–12/31/2015
bromomethane	74–83–9	EPA 524.3	0.2 µg/L ..	EPTDS	1/1/2013–12/31/2015
chlorodifluoromethane (HCFC–22) ...	75–45–6	EPA 524.3	0.08 µg/L	EPTDS	1/1/2013–12/31/2015
bromochloromethane (Halon 1011) ..	74–97–5	EPA 524.3	0.06 µg/L	EPTDS	1/1/2013–12/31/2015
Synthetic Organic Compound					
1,4-dioxane	123–91–1	EPA 522	0.07 µg/L	EPTDS	1/1/2013–12/31/2015
Metals					
vanadium	7440–62–2	EPA 200.8, ASTM D5673–10, SM 3125.	0.2 µg/L ..	EPTDS and DSMRT.	1/1/2013–12/31/2015
molybdenum	7439–98–7	EPA 200.8, ASTM D5673–10, SM 3125.	1. µg/L	EPTDS and DSMRT.	1/1/2013–12/31/2015
cobalt	7440–48–4	EPA 200.8, ASTM D5673–10, SM 3125.	1. µg/L	EPTDS and DSMRT.	1/1/2013–12/31/2015

TABLE 1—UCMR CONTAMINANT LIST—Continued

1-Contaminant	2-CAS Registry No.	3-Analytical methods ^a	4-Minimum reporting level ^b	5-Sampling location ^c	6-Period during which monitoring to be completed
strontium	7440–24–6	EPA 200.8, ASTM D5673–10, SM 3125.	0.3 µg/L ..	EPTDS and DSMRT.	1/1/2013–12/31/2015
Chromium-6					
chromium-6 ^d	18540–29–9	EPA 218.7	0.03 µg/L	EPTDS and DSMRT.	1/1/2013–12/31/2015
Oxyhalide Anion					
chlorate	14866–68–3	EPA 300.1, ASTM D 6581–08, SM 4110D.	20 µg/L ...	EPTDS and DSMRT.	1/1/2013–12/31/2015
Perfluorinated Compounds					
perfluorooctanesulfonic acid (PFOS)	1763–23–1	EPA 537	0.04 µg/L	EPTDS	1/1/2013–12/31/2015
perfluorooctanoic acid (PFOA)	335–67–1	EPA 537	0.02 µg/L	EPTDS	1/1/2013–12/31/2015
perfluorononanoic acid (PFNA)	375–95–1	EPA 537	0.02 µg/L	EPTDS	1/1/2013–12/31/2015
perfluorohexanesulfonic acid (PFHxS)	355–46–4	EPA 537	0.03 µg/L	EPTDS	1/1/2013–12/31/2015
perfluoroheptanoic acid (PFHpA)	375–85–9	EPA 537	0.01 µg/L	EPTDS	1/1/2013–12/31/2015
perfluorobutanesulfonic acid (PFBS)	375–73–5	EPA 537	0.09 µg/L	EPTDS	1/1/2013–12/31/2015
List 2: Screening Survey					
Hormones					
17-β-estradiol	50–28–2	EPA 539	0.0004 µg/L.	EPTDS	1/1/2013–12/31/2015
17-α-ethynylestradiol	57–63–6	EPA 539	0.0009 µg/L.	EPTDS	1/1/2013–12/31/2015
estriol	50–27–1	EPA 539	0.0008 µg/L.	EPTDS	1/1/2013–12/31/2015
equilin	474–86–2	EPA 539	0.004 µg/L.	EPTDS	1/1/2013–12/31/2015
estrone	53–16–7	EPA 539	0.002 µg/L.	EPTDS	1/1/2013–12/31/2015
testosterone	58–22–0	EPA 539	0.0001 µg/L.	EPTDS	1/1/2013–12/31/2015
4-androstene-3,17-dione	63–05–8	EPA 539	0.0003 µg/L.	EPTDS	1/1/2013–12/31/2015
List 3: Pre-Screen Testing^e Microbiological Contaminants					
enteroviruses	N/A	N/A	N/A	EPTDS	1/1/2013–12/31/2015
noroviruses	N/A	N/A	N/A	EPTDS	1/1/2013–12/31/2015
Total Chromium Monitoring					
total chromium	N/A	EPA 200.8, ASTM D5673–10, SM 3125.	0.2 µg/L ..	EPTDS and DSMRT.	1/1/2013–12/31/2015

Column headings are:

1—Contaminant: The name of the contaminant to be analyzed.

2—CAS (Chemical Abstract Service) Registry Number or Identification Number: A unique number identifying the chemical contaminants.

3—Analytical Methods: Method numbers identifying the methods that must be used to test the contaminants. For List 3, analyses will only be performed by laboratories under contract to EPA.

4—Minimum Reporting Level: The value and unit of measure at or above which the concentration of the contaminant must be measured using the approved analytical methods. If EPA determines, after the first six months of monitoring, that the MRLs specified in UCMR 3 result in excessive resampling, EPA will establish alternate MRLs and will notify affected PWSs and laboratories of the new MRLs. For List 3, minimum reporting level is based on volume of water filtered and PCR amplification level.

5—Sampling Location: The locations within a PWS at which samples must be collected.

6—Period During Which Monitoring to be Completed: The time period during which the sampling and testing will occur for the indicated contaminant.

^a The analytical procedures shall be performed in accordance with the documents associated with each method, see paragraph (c) of this section.^b The minimum reporting level (MRL) is the minimum concentration of each analyte that must be reported to EPA.

^c Sampling must occur at entry points to the distribution system (EPTDSs) after treatment is applied that represent each non-emergency water source in routine use over the 12-month period of monitoring. Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. This EPTDS sampling location must be representative of the highest annual volume connections. If the connection selected as the representative EPTDS is not available for sampling, an alternate highest volume representative connection must be sampled. See 40 CFR 141.35(c)(3) for an explanation of the requirements related to use of representative ground water EPTDSs. Sampling for total chromium, chromium-6, cobalt, molybdenum, strontium, vanadium, and chlorate must be conducted at distribution system maximum residence time (DSMRT) sampling locations. DSMRT is defined as an active point (*i.e.*, a location that currently provides water to customers) in the distribution system where the water has been in the system the longest relative to the EPTDS.

^d Chromium-6 will be measured as soluble chromate ion (CAS Registry Number 13907–45–4).

^e EPA will collect the samples from List 3 Pre-Screen Testing sampling locations.

(4) *Sampling requirements*—(i) *Large systems*. If you serve more than 10,000 people and meet the UCMR applicability criteria specified in paragraph (a)(2)(i) of this section, you must comply with the requirements specified in paragraphs (a)(4)(i)(A) through (I) of this section. Your samples must be collected according to the schedule that you are assigned by EPA or your State, or the schedule that you revised using EPA's electronic data reporting system on or before October 1, 2012. Your schedule must follow both the timing and frequency of monitoring specified in Tables 1 and 2 of this section.

(A) *Monitoring period*. You must collect the samples in one continuous 12-month period for List 1 Assessment Monitoring, and, if applicable, for List 2 Screening Survey, or List 3 Pre-Screen Testing, during the time frame indicated in column 6 of Table 1, in

paragraph (a)(3) of this section. EPA or your State will specify the month(s) and year(s) in which your monitoring must occur. As specified in §141.35(c)(5), you must contact EPA if you believe you cannot conduct monitoring according to your schedule.

(B) *Frequency*. You must collect the samples within the time frame and according to the frequency specified by contaminant type and water source type for each sampling location, as specified in Table 2, in this paragraph. For the second or subsequent round of sampling, if a sample location is non-operational for more than one month before and one month after the scheduled sampling month (*i.e.*, it is not possible for you to sample within the window specified in Table 2, in this paragraph), you must notify EPA as specified in §141.35(c)(5) to reschedule your sampling.

TABLE 2—MONITORING FREQUENCY BY CONTAMINANT AND WATER SOURCE TYPES

Contaminant type	Water source type	Time frame	Frequency
Chemical	Surface water or ground water under the direct influence of surface water (GWUDI) (includes all sampling locations for which some or all of the water comes from a surface water or GWUDI source at any time during the 12 month monitoring period).	12 months	You must monitor for 4 consecutive quarters. Sample events must occur 3 months apart. (Example: If first monitoring is in January, the second monitoring must occur any time in April, the third any time in July and the fourth any time in October.)
	Ground water	12 months	You must monitor twice in a consecutive 12-month period. Sample events must occur 5–7 months apart.
Microbiological	Ground water	12 months	You must monitor twice in a consecutive 12-month period. Sample events must occur 5–7 months apart.

(C) *Location*. You must collect samples for each List 1 Assessment Monitoring contaminant, and, if applicable, for each List 2 Screening Survey, or List 3 Pre-Screen Testing contaminant, as specified in Table 1, in paragraph (a)(3) of this section. Samples must be

collected at each sample point that is specified in column 5 and footnote c of Table 1, in paragraph (a)(3) of this section. If you are a ground water system with multiple EPTDSs, and you request and receive approval from EPA

or the State for sampling at representative EPTDS(s), as specified in §141.35(c)(3), you must collect your samples from the approved representative sampling location(s). Systems conducting Assessment Monitoring must also sample for total chromium, chromium-6, cobalt, molybdenum, strontium, vanadium, and chlorate at the location that represents the maximum residence time in the distribution system (DSMRT). DSMRT is defined as an active point (*i.e.*, a location that currently provides water to customers) in the distribution system where the water has been in the system the longest relative to the EPTDS.

(D) *Sampling instructions.* For each List 1 Assessment Monitoring contaminant, and, if applicable, for each List 2 Screening Survey, or List 3 Pre-Screen Testing contaminant, you must follow the sampling procedure for the method specified in column 3 of Table 1, in paragraph (a)(3) of this section. In addition, you must not composite (that is, combine, mix, or blend) the samples; you must collect and preserve each sample separately.

(E) *Sample collection and shipping time.* If you must ship the samples for analysis, you must collect the samples early enough in the day to allow adequate time to send the samples for overnight delivery to the laboratory. You should not collect samples on Friday, Saturday, or Sunday because sampling on these days may not allow samples to be shipped and received at the laboratory at the required temperature, unless you have made special arrangements with your laboratory to receive the samples.

(F) *Analytical methods.* For each contaminant, you must use the respective analytical methods for List 1, and, if applicable, for List 2, or List 3 that are specified in column 3 of Table 1, in paragraph (a)(3) of this section; report values at or above the minimum reporting levels for List 1, and, if applicable, for List 2 Screening Survey, or List 3 Pre-Screen Testing, that are specified in column 4 of Table 1, in paragraph (a)(3) of this section; and conduct the quality control procedures specified in paragraph (a)(5) of this section.

(G) *Laboratory errors or sampling deviations.* If the laboratory data do not meet the required QC criteria, as specified in paragraph (a)(5) of this section, or you do not follow the required sampling procedures, as specified in paragraphs (a)(4) of this section, you must resample within 30 days of being informed or becoming aware of these facts. This resampling is not for the purpose of confirming previous results, but to correct the sampling or laboratory error. All systems must report the results obtained from the first sampling for each sampling period, except for cases of sampling or laboratory errors. For the purposes of this rule, no samples are to be recollected for the purposes of confirming the results observed in a previous sampling.

(H) *Analysis.* For the List 1 contaminants, and, if applicable, List 2 Screening Survey, or List 3 Pre-Screen Testing contaminants, identified in Table 1, paragraph (a)(3) of this section, you must arrange for testing by a laboratory that has been approved by EPA according to requirements in paragraph (a)(5)(ii) of this section.

(I) *Review and reporting of results.* After you have received the laboratory results, you must review, approve, and submit the system information, and sample collection data and test results. You must report the results as provided in §141.35(c)(6).

(ii) *Small systems.* If you serve 10,000 or fewer people and are notified that you are part of the State Monitoring Plan for Assessment Monitoring, Screening Survey or Pre-Screen monitoring, you must comply with the requirements specified in paragraphs (a)(4)(i)(A) through (H) of this section. If EPA or the State informs you that they will be collecting your UCMR samples, you must assist them in identifying the appropriate sampling locations and in collecting the samples.

(A) *Monitoring period and frequency.* You must collect samples at the times specified for you by the State or EPA. Your schedule must follow both the timing of monitoring specified in Table 1, List 1, and, if applicable, List 2, or List 3, and the frequency of monitoring in Table 2 of this section.

(B) *Location.* You must collect samples at the locations specified for you by the State or EPA.

(C) *Sample kits.* You must store and maintain the sample collection kits sent to you by the UCMR Sampling Coordinator in accordance with the kit's instructions. The sample kit will include all necessary containers, packing materials and cold packs, instructions for collecting the sample and sample treatment (such as dechlorination or preservation), report forms for each sample, contact name and telephone number for the laboratory, and a prepaid return shipping docket and return address label. If any of the materials listed in the kit's instructions are not included in the kit or arrive damaged, you must notify the UCMR Sampling Coordinator who sent you the sample collection kits.

(D) *Sampling instructions.* You must comply with the instructions sent to you by the State or EPA concerning the use of containers, collection (how to fill the sample bottle), dechlorination and/or preservation, and sealing and preparation of sample and shipping containers for shipment. You must not composite (that is, combine, mix, or blend) the samples. You also must collect, preserve, and test each sample separately. You must also comply with the instructions sent to you by the UCMR Sampling Coordinator concerning the handling of sample containers for specific contaminants.

(E) *Sampling deviations.* If you do not collect a sample according to the instructions provided to you for a listed contaminant, you must report the deviation within 7 days of the scheduled monitoring on the sample reporting form, as specified in §141.35(d)(2). You must resample following instructions that you will be sent from the UCMR Sampling Coordinator or State. A copy of the form must be sent to the laboratory with the recollected samples, and to the UCMR Sampling Coordinator.

(F) *Duplicate samples.* EPA will select a subset of systems in the State Monitoring Plan that must collect duplicate samples for quality control. If your system is selected, you will receive two sample kits for an individual sampling location that you must use. You must use the same sampling protocols for

both sets of samples, following the instructions in the duplicate sample kit.

(G) *Sampling forms.* You must completely fill out each of the sampling forms and bottles sent to you by the UCMR Sampling Coordinator, including data elements listed in §141.35(e) for each sample, as specified in §141.35(d)(2). You must sign and date the sampling forms.

(H) *Sample collection and shipping.* You must collect the samples early enough in the day to allow adequate time to send the samples for overnight delivery to the laboratory. You should not collect samples on Friday, Saturday, or Sunday because sampling on these days may not allow samples to be shipped and received at the laboratory at the required temperature unless you have made special arrangements with EPA for the laboratory to receive the samples. Once you have collected the samples and completely filled in the sampling forms, you must send the samples and the sampling forms to the laboratory designated on the air bill.

(5) *Quality control requirements.* If your system serves more than 10,000 people, you must ensure that the quality control requirements listed below are met during your sampling procedures and by the laboratory conducting your analyses. You must also ensure that all method quality control procedures and all UCMR quality control procedures are followed.

(i) *Sample collection/preservation.* You must follow the sample collection and preservation requirements for the specified method for each of the contaminants in Table 1, in paragraph (a)(3) of this section. These requirements specify sample containers, collection, dechlorination, preservation, storage, sample holding time, and extract storage and/or holding time that you must assure that the laboratory follow.

(ii) *Laboratory approval for Lists 1, List 2 and List 3.* To be approved to conduct UCMR testing, the laboratory must be certified under §141.28 for one or more compliance analyses; demonstrate for each analytical method it plans to use for UCMR testing that it can meet the Initial Demonstration of Capability (IDC) requirements detailed in the analytical methods specified in column 3 of Table 1, in paragraph (a)(3) of this

section; and successfully participate in the UCMR Proficiency Testing (PT) Program administered by EPA for each analytical method it plans to use for UCMR testing. UCMR laboratory approval decisions will be granted on an individual method basis for the methods listed in column 3 of Table 1 in paragraph (a)(3) of this section for List 1, List 2, and List 3 contaminants. Laboratory approval is contingent upon the capability of the laboratory to post monitoring data to the EPA electronic data reporting system. To participate in the UCMR Laboratory Approval Program, the laboratory must complete and submit the necessary registration forms by August 1, 2012. Correspondence must be addressed to: UCMR Laboratory Approval Coordinator, USEPA, Technical Support Center, 26 West Martin Luther King Drive, (MS 140), Cincinnati, OH 45268; or emailed to EPA at: UCMR_Sampling_Coordinator@epa.gov.

(iii) *Minimum Reporting Level.* The MRL is an estimate of the quantitation limit. Assuming good instrumentation and experienced analysts, an MRL is achievable, with 95% confidence, by 75% of laboratories nationwide.

(A) Validation of laboratory performance. Your laboratory must be capable of quantifying each contaminant listed in Table 1, at or below the MRL specified in column 4 of Table 1, in paragraph (a)(3) of this section. You must ensure that the laboratory completes and has on file and available for your inspection, records of two distinct procedures. First, your laboratory must have conducted an IDC involving replicate analyses at or below the MRL as described in this paragraph. Second, for each day that UCMR analyses are con-

ducted by your laboratory, a validation of its ability to quantify each contaminant, at or below the MRL specified in column 4 of Table 1, in paragraph (a)(3) of this section, following the procedure listed in paragraph (a)(5)(iii)(B) of this section, must be performed. The procedure for initial validation of laboratory performance at or below the MRL is as follows:

(1) All laboratories performing analysis under UCMR must demonstrate that they are capable of meeting data quality objectives at or below the MRL listed in Table 1, column 4, in paragraph (a)(3) of this section.

(2) The MRL, or any concentration below the MRL, at which performance is being evaluated, must be contained within the range of calibration. The calibration curve regression model and the range of calibration levels that are used in these performance validation steps must be used in all routine sample analyses used to comply with this regulation. Only straight line or quadratic regression models are allowed. The use of either weighted or unweighted models is permitted. The use of cubic regression models is not permitted.

(3) Replicate analyses of at least seven (7) fortified samples in reagent water must be performed at or below the MRL for each analyte, and must be processed through the entire method procedure (*i.e.*, including extraction, where applicable, and with all preservatives).

(4) A prediction interval of results (PIR), which is based on the estimated arithmetic mean of analytical results and the estimated sample standard deviation of measurement results, must be determined by Equation 1:

$$\text{Equation 1} \quad \text{PIR} = \text{Mean} \pm s \times t_{(df, 1-\alpha/2)} \times \sqrt{1 + \frac{1}{n}}$$

Where:

t is the Student's *t* value with *df* degrees of freedom and confidence level (1- α),

s is the sample standard deviation of *n* replicate samples fortified at the MRL,

n is the number of replicates.

(5) The values needed to calculate the PIR using Equation 1 are: Number of replicates (*n*); Student's *t* value with a two-sided 99% confidence level for *n* number of replicates; the average (mean) of at least seven replicates; and

the sample standard deviation. Factor 1 is referred to as the Half Range PIR (HR_{PIR}).

$$HR_{PIR} = s \times t_{(df, 1-\alpha/2)} \times \sqrt{1 + \frac{1}{n}}$$

For a certain number of replicates and for a certain confidence level in Student's t , this factor

$$C = t_{(df, 1-\alpha/2)} \times \sqrt{1 + \frac{1}{n}}$$

is constant, and can be tabulated according to replicate number and confidence level for the Student's t . Table 3 in this paragraph lists the constant factor (C) for replicate sample numbers 7 through 10 with a confidence level of 99% for Student's t .

(6) The HR_{PIR} is calculated by Equation 2:

$$\text{Equation 2} \quad HR_{PIR} = s \times C$$

(7) The PIR is calculated by Equation 3:

$$\text{Equation 3} \quad PIR = \text{Mean} \pm HR_{PIR}$$

TABLE 3—THE CONSTANT FACTOR (C) TO BE MULTIPLIED BY THE STANDARD DEVIATION TO DETERMINE THE HALF RANGE INTERVAL OF THE PIR (STUDENT'S t 99% CONFIDENCE LEVEL)^a

Replicates	Degrees of freedom	Constant factor (C) to be multiplied by the standard deviation
7	6	3.963
8	7	3.711
9	8	3.536
10	9	3.409

^aThe critical t -value for a two-sided 99% confidence interval is equivalent to the critical t -value for a one-sided 99.5% confidence interval, due to the symmetry of the t -distribution. PIR = Prediction Interval of Results.

(8) The lower and upper result limits of the PIR must be converted to percent recovery of the concentration being tested. To pass criteria at a certain level, the PIR lower recovery limits cannot be lower than the lower recovery limits of the QC interval (50%), and the PIR upper recovery limits cannot be greater than the upper recovery limits of the QC interval (150%). When either of the PIR recovery limits falls outside of either bound of the QC interval of recovery (higher than 150% or less than 50%), laboratory performance is not validated at the concentration evaluated. If the PIR limits are contained within both bounds of the QC interval, laboratory performance is validated for that analyte.

(B) Quality control requirements for validation of laboratory performance at or below the MRL.

(1) You must ensure that the calibration curve regression model and that the range of calibration levels that are used in these performance validation steps are used in future routine sample

analysis. Only straight line or quadratic regression models are allowed. The use of either weighted or unweighted models is permitted. The use of cubic regression models is not permitted.

(2) You must ensure, once your laboratory has performed an IDC as specified in each analytical method (demonstrating that DQOs are met at or below an MRL), that a daily performance check is performed for each analyte and method. A single laboratory blank, fortified at or below the MRL for each analyte, must be processed through the entire method procedure. The measured concentration for each analyte must be converted to a percent recovery, and if the recovery is within 50%–150% (inclusive), the daily performance of the laboratory has been validated. The results for any analyte for which 50%–150% recovery cannot be demonstrated during the daily check are not valid. Laboratories may elect to re-run the daily performance check sample if the performance for any

analyte or analytes cannot be validated. If performance is validated for these analytes, the laboratory performance is considered validated. Alternatively, the laboratory may re-calibrate and repeat the performance validation process for all analytes.

(iv) *Laboratory fortified sample matrix and laboratory fortified sample matrix duplicate.* You must ensure that your laboratory prepares and analyzes the Laboratory Fortified Sample Matrix (LFSM) sample for accuracy and Laboratory Fortified Sample Matrix Duplicate (LFSMD) samples for precision to determine method accuracy and precision for all contaminants in Table 1, in paragraph (a)(3) of this section. LFSM/LFSMD samples must be prepared using a sample collected and analyzed in accordance with UCMR requirements and analyzed at a frequency of 5% (or 1 LFSM/LFSMD set per every 20 samples) or with each sample batch, whichever is more frequent. In addition, the LFSM/LFSMD fortification concentrations must be alternated between a low-level fortification and mid-level fortification approximately 50% of the time. (For example: A set of 40 samples will require preparation and analysis of 2 LFSM/LFSMD paired samples. The first LFSM/LFSMD paired sample set must be fortified at either the low-level or mid-level, and the second LFSM/LFSMD paired sample set must be fortified with the other standard, either the low-level or mid-level, whichever was not used for the initial LFSM/LFSMD paired sample set.) The low-level LFSM/LFSMD fortification concentration must be within $\pm 50\%$ of the MRL for each contaminant (e.g., for an MRL of 1 $\mu\text{g/L}$ the acceptable fortification levels must be between 0.5 $\mu\text{g/L}$ and 1.5 $\mu\text{g/L}$). The mid-level LFSM/LFSMD fortification concentration must be within $\pm 20\%$ of the mid-level calibration standard for each contaminant, and is to represent, where possible and where the laboratory has data from previously analyzed samples, an approximate average concentration observed in previous analyses of that analyte. There are no UCMR contaminant recovery acceptance criteria specified for LFSM/LFSMD analyses. All LFSM/LFSMD data are to be reported.

(v) *Method defined quality control.* You must ensure that your laboratory performs Laboratory Fortified Blanks and Laboratory Performance Checks, as appropriate to the method's requirements, for those methods listed in Table 1, column 3, in paragraph (a)(3) of this section. Each method specifies acceptance criteria for these QC checks.

(vi) *Reporting.* You must require your laboratory to submit these data electronically to the State and EPA using EPA's electronic data reporting system, accessible at (<http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr3/reporting.cfm>), within 120 days from the sample collection date. You then have 60 days from when the laboratory posts the data to review, approve and submit the data to the State and EPA, via EPA's electronic data reporting system. If you do not electronically approve and submit the laboratory data to EPA within 60 days of the laboratory posting data to EPA's electronic reporting system, the data will be considered approved and available for State and EPA review.

(6) *Violation of this rule—(i) Monitoring violations.* Any failure to monitor in accordance with § 141.40(a)(3)–(5) is a monitoring violation.

(ii) *Reporting violations.* Any failure to report in accordance with § 141.35 is a reporting violation.

(b) *Petitions and waivers by States—(1) Governors' petition for additional contaminants.* The Safe Drinking Water Act allows Governors of seven (7) or more States to petition the EPA Administrator to add one or more contaminants to the UCMR Contaminant List in paragraph (a)(3) of this section. The petition must clearly identify the reason(s) for adding the contaminant(s) to the monitoring list, including the potential risk to public health, particularly any information that might be available regarding disproportional risks to the health and safety of children, the expected occurrence documented by any available data, any analytical methods known or proposed to be used to test for the contaminant(s), and any other information that could assist the Administrator in determining which contaminants present the greatest public health concern and should, therefore, be included on the

UCMR Contaminant List in paragraph (a)(3) of this section.

(2) *State-wide waivers.* A State can waive monitoring requirements only with EPA approval and under very limited conditions. Conditions and procedures for obtaining a waiver are as follows:

(i) *Application.* A State may apply to EPA for a State-wide waiver from the unregulated contaminant monitoring requirements for PWSs serving more than 10,000 people. To apply for such a waiver, the State must submit an application to EPA that includes the following information: The list of contaminants on the UCMR Contaminant List for which a waiver is requested, along with documentation for each contaminant in the request demonstrating that the contaminants or their parent compounds do not occur naturally in the State, and certifying that during the past 15 years they have not been used, applied, stored, disposed of, released, or detected in the source waters or distribution systems in the State.

(ii) *Approval.* EPA will review State applications and notify the State whether it accepts or rejects the request. The State must receive written approval from EPA before issuing a State-wide waiver.

(c) *Incorporation by reference.* These standards are incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection either electronically at www.regulations.gov, in hard copy at the Water Docket, EPA/DC, and from the sources below. The Public Reading Room (EPA West, Room 3334, 1301 Constitution Ave. NW., Washington, DC) is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for this Public Reading Room is (202) 566-1744, and the telephone number for the Water Docket is (202) 566-2426. The material is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741-6030 or go to http://www.archives.gov/federal_register/

[code_of_federal_regulations/ibr_locations.html](http://www.epa.gov/code_of_federal_regulations/ibr_locations.html).

(1) The following methods from the U.S. Environmental Protection Agency, Water Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave. NW., Washington, DC 20004.

(i) EPA Method 200.8 “Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma—Mass Spectrometry,” Revision 5.4, 1994, available at <https://www.NEMI.gov>.

(ii) EPA Method 218.7 “Determination of Hexavalent Chromium in Drinking Water by Ion Chromatography with Post-Column Derivatization and UV-Visible Spectroscopic Detection,” Version 1.0, November 2011, EPA 815-R-11-005, available at http://water.epa.gov/scitech/drinkingwater/labcert/analyticalmethods_ogwdw.cfm.

(iii) EPA Method 300.1 “Determination of Inorganic Anions in Drinking Water by Ion Chromatography,” Revision 1.0, 1997, available at http://water.epa.gov/scitech/drinkingwater/labcert/analyticalmethods_ogwdw.cfm.

(iv) EPA Method 522 “Determination of 1,4-Dioxane in Drinking Water by Solid Phase Extraction (SPE) and Gas Chromatography/Mass Spectrometry (GC/MS) with Selected Ion Monitoring (SIM),” Version 1.0, September 2008, EPA/600/R-08/101, available at <http://www.epa.gov/nerlcwww/ordmeth.htm>.

(v) EPA Method 524.3 “Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry,” Version 1.0, June 2009, EPA 815-B-09-009, available at http://water.epa.gov/scitech/drinkingwater/labcert/analyticalmethods_ogwdw.cfm.

(vi) EPA Method 537 “Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS),” Version 1.1, September 2009, EPA/600/R-08/092, available at <http://www.epa.gov/nerlcwww/ordmeth.htm>.

(vii) EPA Method 539 “Determination of Hormones in Drinking Water by Solid Phase Extraction (SPE) and Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC-ESI-MS/MS),” Version 1.0, November 2010, EPA 815-B-10-001, available at <http://water.epa.gov/scitech/>

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*drinkingwater/labcert/
analyticalmethods_ogwdw.cfm.*

(2) The following methods from “ASTM International,” 100 Barr Harbor Drive, West Conshohocken, PA 19428.

(i) ASTM D5673–10 “Standard Test Method for Elements in Water by Inductively Coupled Plasma–Mass Spectrometry,” approved August 1, 2010. Available for purchase at <http://www.astm.org/Standards/D5673.htm>.

(ii) ASTM D6581–08 “Standard Test Methods for Bromate, Bromide, Chlorate, and Chlorite in Drinking Water by Suppressed Ion Chromatography,” approved August 15, 2008. Available for purchase at <http://www.astm.org/Standards/D6581.htm>.

(3) The following methods from “Standard Methods for the Examination of Water & Wastewater,” 21st edition (2005), American Public Health Association, 800 I Street NW., Washington, DC 20001–3710.

(i) SM 3125 “Metals by Inductively Coupled Plasma/Mass Spectrometry.”

(ii) SM 4110D “Determination of Anions by Ion Chromatography, Part D, Ion Chromatography Determination of Oxyhalides and Bromide.”

[72 FR 393, Jan. 4, 2007; 72 FR 3916, Jan. 26, 2007, as amended at 77 FR 26098, May 2, 2012]

§ 141.41 Special monitoring for sodium.

(a) Suppliers of water for community public water systems shall collect and analyze one sample per plant at the entry point of the distribution system for the determination of sodium concentration levels; samples must be collected and analyzed annually for systems utilizing surface water sources in whole or in part, and at least every three years for systems utilizing solely ground water sources. The minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may, with the State approval, be considered one treatment plant for determining the minimum number of samples. The supplier of water may be required by the State to collect and analyze water samples for sodium more

frequently in locations where the sodium content is variable.

(b) The supplier of water shall report to EPA and/or the State the results of the analyses for sodium within the first 10 days of the month following the month in which the sample results were received or within the first 10 days following the end of the required monitoring period as stipulated by the State, whichever of these is first. If more than annual sampling is required the supplier shall report the average sodium concentration within 10 days of the month following the month in which the analytical results of the last sample used for the annual average was received. The supplier of water shall not be required to report the results to EPA where the State has adopted this regulation and results are reported to the State. The supplier shall report the results to EPA where the State has not adopted this regulation.

(c) The supplier of water shall notify appropriate local and State public health officials of the sodium levels by written notice by direct mail within three months. A copy of each notice required to be provided by this paragraph shall be sent to EPA and/or the State within 10 days of its issuance. The supplier of water is not required to notify appropriate local and State public health officials of the sodium levels where the State provides such notices in lieu of the supplier.

(d) Analyses for sodium shall be conducted as directed in § 141.23(k)(1).

[45 FR 57345, Aug. 27, 1980, as amended at 59 FR 62470, Dec. 5, 1994]

§ 141.42 Special monitoring for corrosivity characteristics.

(a)–(c) [Reserved]

(d) Community water supply systems shall identify whether the following construction materials are present in their distribution system and report to the State:

Lead from piping, solder, caulking, interior lining of distribution mains, alloys and home plumbing.
Copper from piping and alloys, service lines, and home plumbing.
Galvanized piping, service lines, and home plumbing.
Ferrous piping materials such as cast iron and steel.
Asbestos cement pipe.